

Unit -IV

Chapter-18. Growth and Development in plants

IMPORTANT POINTS

- In plants development is considered as the sum of these processes - (1) Growth and (2) Differentiation.
- During this process a complex body organisation is formed that produces roots, leaves, branches, flowers, fruits, seeds eventually they die.
- Growth can be defined as an irreversible increase in the size and weight also number of the cells of an organism. Physiologically speaking, growth is an outcome of metabolism. There is an increase in the dry weight as an outcome of growth.
- In plants, growth is limited to meristematic tissues only. There are three main activities involved in the process of growth - (1) Cell division of meristematic cells. (2) Enlargement of newly formed cells. (3) Cellular differentiation.
- Growth in length is called- primary growth and growth in the girth is called- secondary growth. The increased growth per unit time is known as growth rate.
- Growth is divided into three phases: (1) Phase of cell division. (2) Phase of cell enlargement and (3) Phase of cell differentiation. The entire period, covering the period from cell division to cell differentiation is called grand period of growth.
- Some cells lose power of division and acquire definite characteristics and become permanent tissue. These are called differentiated cells. Such differentiated cells regain their power of division under specific conditions; these cells are called dedifferentiated cells (eg. root cambium)
- Factors which affect growth are water, oxygen, temperature, light and nutrients. For a more exact measurement of growth in length of a plant, an auxanometer is used.
- Development is a term that includes all changes, that an organism goes through during its life cycle from germination of the seed to senescence. The plant growth regulators (PGRs) are small, simple, molecules of diverse chemical composition. Such chemicals are called plant-growth regulators or plant hormones. They are classified into five main groups: (1) Auxins, (2) Gibberellins, (3) Cytokinins, (4) Abscisic acid and (5) Ethylene. Some of the vitamins also act as growth-regulators.
- Seed dormancy is defined as a state in which seeds are prevented from germinating even under environmental conditions or external factors normally are favorable for germination. There are mainly four types of dormancy: (1) Exogenous dormancy, (2) Endogenous dormancy, (3) Combinational dormancy, (4) Secondary dormancy. The entire process from the sowing of the seed in the soil to the emergence of a young sapling, constitutes germination. "Mangroves" are a special type of vegetation which live in the basin (creek) region around sea-shore. They exhibit a different kind of germination, such a germination is called "Viviparous germination".
- Senescence is a period between complete maturation of an individual and the death of that individual. The phenomenon of the dropping of leaf, flower and fruit is called-abscission. In the development

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of plants and process of flowering, response to the stimulus of “period of available light” by plants is called photoperiodism. Better and earlier germination is induced, when seeds are provided with specific low temperatures for a definite period of time. Flowering is also earlier in the plants which develop from them. This artificial treatment is called vernalization.

There are two main types of plant movements; (a) Locomotory movement (1) Autonomous movement; (i) Amoebic movement; (ii) Induced movement; (iii) Circulatory movement and (iv) Rotation movement. (2) Induced movement (i) Phototaxis, (ii) Chemotaxis (iii) Thermotaxis, (iv) Thigmotaxis. (b) Curvature movements: (1) Autonomous movement (i) Epinasty, (ii) Hyponasty, (iii) Nutation, (iv) Circunutation and (v) Variation. (2) Induced movement: There are two type: (i) Tropism, (a) Phototropism, (b) Geotropism, (c) Hydrotropism and (ii) Nastism, (a) Photonasty, (b) Thermonasty (c) Hydronasty, (d) Thigmonasty

- What is the maximum period of growth ?
(a) Slow growth rate (b) Steady growth rate
(c) Speedy growth rate (d) Senescence phase
- Which apparatus is used for measurement of growth ?
(a) Auxanometer (b) Potometer (c) Photometer (d) Hydrometer
- Ethylene is responsible for
(a) Flowering (b) Disease in roots (c) Ripping of fruits (d) Formation of fruits
- What is the cause of ‘Bakane’ disease?
(a) Fungi (b) Algae (c) Bacteria (d) Virus
- Which substances are secreted at the apex of plant and they regulates growth of another region ?
(a) Enzymes (b) Hormones (c) Vitamins (d) None of the above
- Which type of growth is seen in plants?
(a) Irreversible (b) Increase in volume (c) Local (d) Reversible
- Which of the following substance is not related with initiation of growth ?
(a) ABA (b) Gibberrelin (c) IAA (d) Cytokinin
- Which group is correct for the growth inducer hormone ?
(a) IAA, ABA and cytokinins (b) IAA, Gibberrelin, ABA
(c) IAA, Gibberrelin, cytokinins (d) ABA, Ethylene
- What is the main origin of cytokinin?
(a) Stem apex (b) Root apex (c) Young leaves (d) Lateral buds
- Mention the effect of cytokinin
(a) It induces cell division and retards the process of senescence
(b) It maintains dormancy
(c) It induces senescence
(d) It inhibits cell division

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11. Give full form of 2-4-D
 - (a) 2-4 dichloro phenoxy acetic acid
 - (b) 2-4 dichloro butyric acid
 - (c) 2-4 dichloro naphthalic acetic acid
 - (d) 2-4 dichloro ethylenic acid
12. Which of the following stimulates growth in the internode region ?
 - (a) Auxin (b) Gibberrelin (c) Cytokinin (d) Abscisic acid
13. Oat - coleoptile test (coleoptile-test) is conducted for which hormone ?
 - (a) Abscisic acid (b) Gibberrellic acid (GA)
 - (c) Indole acetic acid (IAA) (d) Indole naphthalne acetic acid (INAA)
14. Gibberrelin participate in which of the following process?
 - (a) Removal of seed dormancy (b) Developing seed less fruit
 - (c) Growth of internodes (d) All of the above
15. Tropic movement is due to
 - (a) Bidirectional effect of environmental factors on plant parts
 - (b) Unidirectional effect of environmental factors on plant parts
 - (c) Multidirectional effect of environmental factors on plant parts
 - (d) No effect of environmental factors on plant parts
16. Which is the correct sequence for different phases of growth?
 - (a) Cell formation of cell differentiation- cell elongation
 - (b) Cell formation - cell elongation- cell differentiation
 - (c) Cell differentiation- cell elongation- cell formation
 - (d) Cell differentiation- cell formation- cell elongation
17. What is the period of cell formation to cell differntiation ?
 - (a) Sigmoid graph (b) Normal growth period
 - (c) Maximum growth period (d) Grand period of growth
18. What is the required temperature for growth in most of the plants?
 - (a) 20-30 ° C (b) 35-40 ° C (c) 10-15 ° C (d) 15-20 ° C
19. Zeatin is an example of
 - (a) ABA (b) Auxin (c) Gibberrellin (d) Cytokinin
20. Spiral developement of tendrils? (BHU 1989, CBSE 1999, 1995), (MPPMT 1992, CPMT 1993)
(CETCHO 2000,AIIMS 2000) (JK CMEE 2004)
 - (a) Thigmotropism (b) Thermotropism
 - (c) Hydrotropism (d) Phototropism
21. State the full form of IAA (NCRT 1974)
 - (a) Indole- 3 acetic anhydrase (b) Indole-3 acetic acid
 - (c) Indole- 3 aceto acetate (d) Indole-3 aceto-acetic

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22. Which of the following physiological process performed by gibberrellic acid?
(a) Dwarfism of tall plant genetically
(b) Elongation of short plant genetically
(c) Growth in size of stem and root formation
(d) Yellowing of young leaves
23. Which of the following is used to enhance colour of fruits and more juice in fruits unnaturally?
(a) Sodium chloride (b) IAA (c) Ethylene gas (d) kinetin
24. Which hormone is responsible for apical dominance?
(a) Auxin (b) Cytokinin (c) Gibberrelin (d) Ethylene
25. With which reaction Phytochrome is associated ?
(AIMS- 1989, 1990, CBSE 1988, BHU 1981, 1991)
(a) Phototropism (b) Photorespiration (c) Photo-period (d) Geotropism
26. In the absence of light, amount of which of the following is increased ?
(a) Absorption of mineral salts (b) Absorption of water
(c) Elongation of internodes (d) Ascent of sap
27. When is abscission- layer formed? (AIIMS- 1980)
(a) With increased concentration of auxin (b) With decreased concentration of auxin
(c) With increased concentration of gibberrelin (d) With decreased concentraton of gibberrelin
28. Vernalization is (MPPMT- 1990, AMU- 1999, IKCMEE- 2000)
(a) Growth graph related to light
(b) Effect of photoperiod on the growth of plant, which results flowering
(c) Rapid growth in low temperature
(d) Daily photo period
29. What is initiative substance of IAA? (PMT- 1990- APMEE 2002)
(a) Tryptophan (b) Lucine (c) Tyrosine (d) Phehyl alamine
30. What is apical dominance? (CPMT- 1989)
(a) Growth of apical bud is inhibited due to nearby lateral buds
(b) Growth of apical bud is promoted due to removal of nearest lateral buds
(c) Removal of apical bud hinders growth of lateral buds
(d) Development of lateral buds hinders due to presence of apical bud
31. Which of the following is water stress hormone?
(CBSE-1993, MPPMT-1995, BHU 1998, CETCHD, Kerala 2000, Orissa- 2003)
(a) Benzyl amino purine (b) 2,4- dichlorophenoxy acetic acid
(c) Ethylene (d) Absciscic acid
32. If apical region of stem is removed from any plant, what is observed?
(CMPT - 1993, CBSE -1994, 2000, KARNATAKA - 2000)
(a) New apical bud formation (b) Length of main stem increases
(c) Plant dies (d) Lateral branches emerges

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33. Which of the hormone is synthetic ? (MPPMT 1996, AIIMS 1996, BHU 1997, CPMT 1999)
(a) GA_3 (b) GA_2 (c) IAA (d) 2-4 D
34. What is 2-4 D ?
(a) Weedicide (b) Insecticide (c) Rodenticide (d) Wormicide
35. What is agent Orange ? (CBSE 1998, AIMS 1999)
(a) Weedicide with dioxin (b) Chemical used in luminiscent plant
(c) Insecticide which is biodegradable (d) Colour used in tube light
36. One plant group kept for 12 hrs in day and 12 hrs in night and flowering is observed in it. Another plant group is kept similarly for day - night period and for very short time light is given during dark period it do not flower. What is such type of plant called ? (CBSE 2004)
(a) Long-day plants (b) Day-neutral plants
(c) Medium-day plants (d) Short-day plants
37. How gibberrelin accelerates seed germination ? (AIIMS 2005)
(a) By effecting rate of cell division (b) By the synthesis of digestive juice
(c) Abscisic acid (d) Absorption of water from hard seed coat
38. What is the colour of Phytochrome pigment ?
(a) Yellowish green (b) Bluish (c) Red (d) Pink
39. What is the reason of senescence leaf ?
(a) Ethylene (b) Abscisic acid (c) cytokinin (d) Auxin
40. Which hormone is responsible for bolting ?
(a) Auxin (b) Cytokinin (c) Gibberrelin (d) Ethylene
41. Which hormone is synthesized by root and endosperm?
(a) Auxin (b) Cytokinin (c) Gibberrelin (d) Ethylene
42. Which hormone is responsible for growth of leaf-apex ?
(a) IAA (b) Zeatin (c) Gibberrelin (d) Ethylene
43. How can a biannual plant be converted into an annual plant?
(a) By cold process of seeds
(b) By giving more light
(c) By giving more oxygen
(d) By giving more temperature
44. Which of the following reaction is observed in dropping of drocera due to insects ?
(a) Thigmonasty (b) Chemotropism (c) Photonasty (d) Thigmotropism
45. What is responsible for opening and closing of tulip flower ?
(a) Photonastic movement (b) Geotropism
(c) Thermonasty (d) Nictinasty
46. By which reaction growth of cuscuta occurs on host plant ?
(a) Thigmotropism (b) Chemtropism (c) Thigmonasty (d) Photonasty

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47. Which type of meristematic tissue is found in monocot plant for growth ?
(a) Intercalary meristematic tissue (b) Apical meristem tissue
(c) Lateral meristem tissue (d) Meristematic tissue
48. Which of the following is increased in plants as a result of growth ?
(a) Dry volume (b) Width (c) Number (d) Dry weight
49. Which of the following is criteria for measurement of growth ?
(a) Number (b) Weight (c) Volume (d) All a, b, c
50. In which phase of growth size of vacuole increases ?
(a) Cell formation (b) Cell elongation (c) cell differentiation (d) Cell transfer
51. What is the optimum temperature for growth of the plants ?
(a) 25 to 30°C (b) 28 to 30°C (c) 0 to 30°C (d) 0 to 28°C
52. Which apparatus is used for exact measuring of growth of plants in longitudinal axis ?
(a) Measuring scale (b) Auxanometer (c) Manometer (d) Sphigomanometer
53. Growth regulators are chemically
- (a) Organic chemicals (b) Inorganic chemicals (c) Minerals (d) Vitamins
54. From where auxin was isolated for the first time ?
(a) Coleoptile of oat (b) Sperm cell of herring fish
(c) Paddy plant (d) Human urine
55. Which of the following should be used for the control of weeds in farms ?
(a) Cytokinin (b) Auxin (c) Gibberrelin (d) Ethylene
56. Which chemical induces formation of adventitious roots ?
(a) Gibberrelin (b) IAA (c) Absciscic acid (d) Cytokinins
57. Which is incorrect for the effects of auxin ?
(a) Induces +ve phototropism (b) Induces growth and length in stem
(c) Shows apical dominance (d) Induces -ve phototropism in roots
58. Which of the following organic substance is growth inhibitor ?
(a) IBA (b) ABA (c) IAA (d) GA
59. From where indole acetic acid an organic substance was isolated for the first time ?
(a) Animal fat (b) Gibberrela (c) Human urine (d) Fish
60. Cytokinin is formed in which of the following region ?
(a) Region of cell elongation (b) Regions of senescence
(c) Regions of cell division (d) Regions of abscission
61. Which hormone reduces the dominance of apical bud ?
(a) Auxin (b) ABA (c) Ethylene (d) Cytokinin
62. Which is incorrect option for cytokinin ?
(a) Retards senescence (b) Secreted in the region of active cell division
(c) Increases dominance of apical bud (d) Stimulates cell division

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63. Drooping of fruit, after fruit maturation (ripening) shows
(a) Increase in amount of auxin (b) Decreases in amount of auxin
(c) Reduces in amount of ABA (d) Increase gibberrellic acid
64. Which of the following is mismatched statement for effect of auxin ?
(a) It inhibits lateral growth (b) It induces stem elongation in plant
(c) It induces cell division (d) It helps in further elongation of some regions
65. Which hormone is essential for initial growth of root ?
(a) IBA (b) GA (c) ABA (d) Kinetin
66. Which is the specific use of synthetic auxin in higher concentration ?
(a) Weedicide
(b) Inhibits growth of lateral buds
(c) Inhibits initial process of root formation
(d) Regulates cell elongation
67. Which of the following organic chemical is synthetic ?
(a) 2-4-D (b) IAA (c) GA (d) IBA
68. Which is required to inhibit germination of food storing part of potato ?
(a) ABA (b) IAA (c) IBA (d) GA
69. This hormone induces growth of root but inhibits growth of
(a) Apical bud (b) Unfertilized fruit development
(c) Lateral buds (d) Root
70. What is indicated by any of the developing plant if it increase / hyperactivity in lateral buds ?
(a) It obtains more light (b) Cytokinin decreases
(c) It stores more food (d) Auxin decreases
71. From where gibberrelin was isolated for the first time ?
(a) Penicillium (b) Asparagus (c) Mucor (d) Gibberella
72. Which of the following effect of gibberrelin is observed in plant ?
(a) Long plant shortens (b) Dwarf plant grows in longitudinal axis
(c) Induces formation of root system (d) Yellowing of young leaves
73. Which of the following hormone is responsible for cell division ?
(a) GA (b) IAA (c) Cytokinin (d) Absciscic acid
74. Garland of green leaves remain green, by treatment of which organic chemical ?
(a) Cytokinin (b) Auxin (c) Ethylene (d) Gibberrelin
75. Which hormone inhibits senescence of vegetative parts and plants ?
(a) Auxin (b) Cytokinin (c) Gibberrelin (d) Absciscic acid
76. Which is natural growth inhibitor or senescence inducing hormone ?
(a) IAA (b) ABA (c) NAA (d) GA
77. Which hormone affects the growth of plant in adverse climatic / environmental condition ?
(a) Absciscic acid (b) Ethylene (c) NAA (d) 2-4, D

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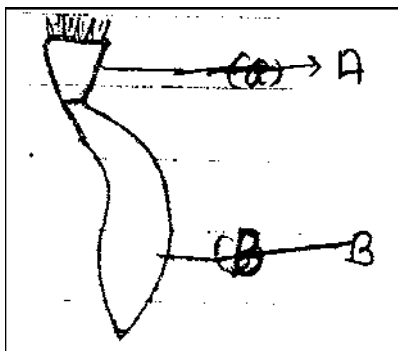
78. Which of the following phenomenon is regulated by abscisic acid ?
(a) Shoot elongation (b) Origin of cell wall and cell elongation
(c) Opening and closing of stomata (d) Abscission of leaf and dormancy
79. Which hormone inhibits formation of new cells ?
(a) Abscisic acid (b) Kinetin (c) Gibberrellic acid (d) Indol-butamic acid
80. Which of the following is responsible for seed dormancy ?
(a) Abscisic acid (b) Ethylene (c) Gibberrelin (d) Auxin
81. Name the hormone responsible for activity of chlorophyll in leaves.
(a) Cytokinin (b) Ethylene (c) Gibberrelin (d) ABA
82. Which of the following is simple, volatile hormone ?
(a) Ethylene (b) ABA (c) IAA (d) Cytokinin
83. Which of the following statement about ABA is inappropriate ?
(a) Induces ripening of fruit (b) Inhibits seed germination
(c) Induces dormancy of bud (d) Closes stomata
84. Which hormone is absent in dormant seed ?
(a) ABA (b) Auxin (c) GA (d) Ethylene
85. Which of the following statement is true for abscisic acid ?
(a) Inhibits transcription of gene (b) Opens stomata
(c) Reduces senescence (d) Acts as weedicide
86. By which physiological process water enters into seed coats of seed ?
(a) Endosmosis (b) Diffusion (c) Plasmolysis (d) Imbibition
87. What is called the effect of daylight on plant ?
(a) Phototropic (b) Photoperiodism (c) Photooxidation (d) Photonastism
88. Which of the following is correct option for seed germination ?
(a) Emergence of radicle from primary root (b) Emergence of primary root forms from radicle
(c) Development of primary root (d) No root formation
89. What is the rate of respiration during seed germination ?
(a) Slow (b) Steady (c) Rapid (d) Zero
90. Which of the following group show viviparous germination ?
(a) Rhizophora and Avicinnia (b) Orchid and Rhizophora
(c) Maize and Bean (d) Soyabean and Xanthium
91. Which of the following is found in high concentration in healthy leaf ?
(a) Cytokinin (b) Gibberrelin (c) Auxin (d) Ethylene
92. From the given below which is short-day plant ?
(a) Paddy (b) Wheat (c) Oat (d) Opium
93. Which of the following is long-day plant ?
(a) Oat (b) Soyabean (c) Vinca (d) Paddy

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94. Which hormones are obtained from fungi and fish, respectively ?
(a) Gibberrelin and zeatin (b) IAA and IBA
(b) Gibberrelin and 2-4 D (d) Gibberrelin and cytokinin
95. Vernalization means.....
(a) Growth Graph
(b) Flowering at high temperature
(c) Effect of light on growth
(d) Speedy flowering at low temperature
96. Flowering due to low temperature is
(a) Thermonasty (b) Vernalization (c) Nutation (d) Photonasty
97. If temporary light is made available for dark phase of long day plant, what is observed ?
(a) Flowering will not occur (b) Increase in flowering
(c) Decreasing in flowering (d) No change
98. Which is an essential temperature for more production of wheat by noting effect of low temperature ?
(a) 1 to 20°C (b) 28 to 30°C (c) 1 to 10°C (d) 25 to 30°C
99. By which condition flowering take place in short day plant ?
(a) Short day and long night (b) Short day and short night
(c) Short night (d) Long day and short night
100. Which type of light is required in long day plants for flowering ?
(a) Red light (b) More light than allotted period
(c) Less light than allotted time period (d) All of the given
101. Where is phytochrome pigment present ?
(a) Fungi (b) Algae (c) Bryophyta (d) Phanerogams
102. Which physiological reaction is essential for development leaf tendril ?
(a) Curvature (b) Nastism (c) Circumnutation (d) Tropism
103. Photoperiodism is
(a) Time table of day-night based on light (b) Flowering plant
(c) Effect of length of day on flowering (d) Irregular growth based on light
104. Which hormone is essential in pineapple for inducing flowering, without season ?
(a) Ethylene (b) Zeatin (c) Absciscic acid (d) NAA
105. Which of the following plant shows rotational movement ?
(a) Volvox (b) Chlamydomonas (c) Hydrilla (d) Mucilagenous fungi
106. Which of the following is example of amoeboid movement ?
(a) Algae (b) Fungi
(c) Gametes of bryophyta (d) Hydrilla
107. Which of the following option shows an examples of ciliary movement ?
(a) Zoo spores and Bryophyta (b) Chlamydomonas
(c) Slime mould (d) All the three a, b, c

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108. Which plant show movement from intense light to dim light ?
 (a) Volvox (b) Lotus (c) Hydrilla (d) Plankton
109. Which of the following show movement by chemical ?
 (a) Male gametes of bryophytes and pteridophytes
 (b) Male gametes of fungi and algae
 (c) Male gametes of gymnosperm and angiosperms
 (d) Flower of tulip and crocus
110. Which of the following is an example of thermonasty ?
 (a) Lotus (b) Crocus
 (c) Mimosa (d) Sunflower
111. In which structure thigmonasty is observed in simple form ?
 (a) Leaf apex (b) Shoot apex (c) Root apex (d) Leaf tendril
112. Demonstration of cytoplasmic movement in living cell can be observed in
 (a) Onion cells (b) Medullary cells
 (c) Leaf cells of tradescantia (d) Cells of vascular bundle
113. Which factor increases in plant in absence of light ?
 (a) Availability of water, increases ascent of sap.
 (b) Availability of mineral ion, increases mineral nutrition
 (c) Area of leaf-blade increase, rate of transpiration increases.
 (d) Length of internode increases, growth of plant in longitudinal axis.
114. Sensitivity of leaves in Mimosa, depends on which factor ?
 (a) Temperature (b) Light (c) Water (d) Touch
115. Movement of cilia in Droscera, depends on which factor ?
 (a) Light (b) Temperature (c) Touch (d) Osmosis
116. Which are the labelled part A and B ?

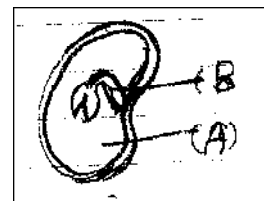


- (a) Fruit and plumule
 (b) Plumule and radicle
 (c) Fruit and radicle
 (d) Plumule and cotyledon

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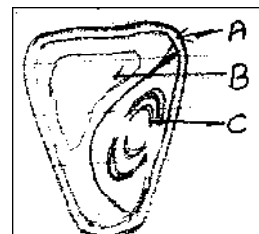
117. Which is the labelled part A and B given in the figure ?

- (a) Cotyledon and Hypocotyl
- (b) Cotyledon and plumule
- (c) Cotyledon and Epicotyl
- (d) Fruit and hypocotyl



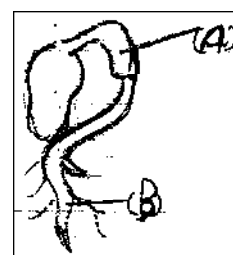
118. Which are the part labelled as A, B and C sequentially in the figure ?

- (a) Seed coat, cotyledon, plumule
- (b) Seed coat, Endosperm, plumule
- (c) Plumule, radicle, cotyledon
- (d) Cotyledon, plumule, embryo



119. Mention part A and B, labelled in the figure.

- (a) Radicle, primary root
- (b) Epicotyl, radicle
- (c) Hypocotyl, primary root
- (d) Epicotyl, primary root



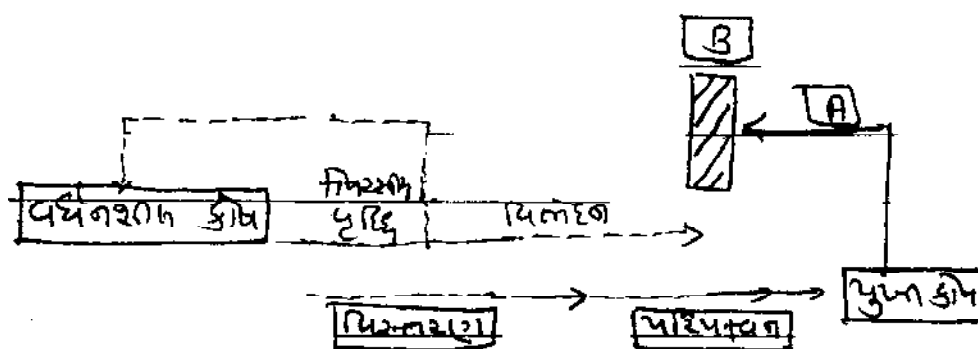
120. If cells obtain ability of cell division in certain circumstances, it is called

- (a) Differentiation (b) Cleavage (c) De-Deferentiation (d) Undifferentiation

121. In certain condition, dividing cell, loose their ability of cell division, it is called

- (a) Differentiation (b) Cleavage (c) De-differentiation (d) Undifferentiation

122. What is A and B in the given figure ?



- (a) Senescence and death (b) Death and senescence
- (c) Growth and death (d) Death and senescence

123. Which organic chemicals are included in shoot with photoperiodism ?

(AIIMS-1996)

- (a) Ethylene (b) Cytokinin
- (c) Auxin (d) Gibberrelin

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124. Motor cells of leaves and grass, shows which type of movement ? (AIIMS-1996)
 (a) Locomotory movement (b) Growth movement
 (c) Nastic movement (d) Osmotic movement
125. Which activity in plant is observed due to ethylene ?
 (a) Matutiation of leaf (b) Maturation of fruit
 (c) Maturation of flower (d) Maturation of seeds
126. Which of the following type is improper for nastism ?
 (a) Photonasty (b) Hydronasty
 (c) Thermonasty (d) Phototropism
127. Which of the following is incorrect for tropism ?
 (a) Phototropism (b) Thermotropism
 (c) Hydrotropism (d) Thigmotaxis
128. What is the direction of tropism ?
 (a) Straight (b) Oblique
 (c) Undirectional (d) Directional
129. Which of the example is improper for tropic movement ?
 (a) Volvox (B) Antherozoids of bryophytes
 (c) Antherozoids of pteridophytes (d) Mimosa
130. With, what nutation is related ?
 (a) Autonomous movement (b) Induced movement
 (c) Autonomous curvature movement (d) Induced curvature movement
131. Match the list :
- | Column I | Column II |
|------------------------------------|------------------------------------|
| (P) Volvox | (i) Chemotaxis |
| (Q) Mimosa | (ii) Phototaxis |
| (R) Antherozoids of bryophytes | (iii) Movement / tropism |
| (S) Leaf tendril | (iv) Thigmotropism |
| (a) (P-i), (Q-ii), (R-iii), (S-iv) | (b) (P-ii), (Q-iii), (R-iv), (S-i) |
| (c) (P-ii), (Q-iv), (R-i), (S-iii) | (d) (P-iv), (Q-iii), (R-ii), (S-i) |
132. Match the list :
- | Column I | Column II |
|---------------------------------------|------------------------------------|
| (P) Plasmodium of slime mould | (i) Ciliary movement |
| (Q) Chlamydomonas algae | (ii) Circular movement |
| (R) protoplasm of tradenschantia leaf | (iii) Rotational movement |
| (S) Protoplasm of hydrilla | (iv) Amoeboid movement leaves |
| (a) (P-i), (Q-ii), (R-iii), (S-iv) | (b) (P-iv), (Q-iii), (R-iv), (S-i) |
| (c) (P-iv), (Q-i), (R-ii), (S-iii) | (d) (P-iv), (Q-ii), (R-i), (S-iii) |

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133. Match the following :

Column I

- (P) Zoospore of volvox
 (Q) Antherozoids of bryophytes and pteridophytes
 (R) Diatoms
 (S) Zoospores in oedogonium

Column II

- (i) Thermo taxis
 (ii) Thigmo taxis
 (iii) Photo taxis
 (iv) Chemo taxis

- (a) (P-i), (Q-ii), (R-iii), (S-iv) (b) (P-iv), (Q-iii), (R-ii), (S-i)
 (c) (P-iii), (Q-iv), (R-i), (S-ii) (d) (P-iii), (Q-ii), (R-i), (S-iv)

134. Match the following :

Column I

- (P) Opening of leaf blade
 (Q) Closing of leaves
 (R) Zigzag movement in apical bud
 (S) Spiral and helical growth of tendrilar plants
 (T) Pulsation in leaflets of indian telegraph plant

Column II

- (i) Epinasty
 (ii) Hyponasty
 (iii) Nutation
 (iv) Circumnutation
 (v) Variation

- (a) (P-i), (Q-ii), (R-iii), (S-iv), (T-v) (b) (P-v), (Q-iv), (R-iii), (S-ii), (T-i)
 (c) (P-v), (Q-i), (R-iv), (S-iii), (T-ii) (d) (P-v), (Q-i), (R-iv), (S-ii), (T-iii)

135. Match the list :

Column I

- (P) Phototropism
 (Q) Geotropism
 (R) Hydrotropism
 (S) Thigmotropism

Column II

- (i) Water
 (ii) Gravitation
 (iii) Light
 (iv) Touch

- (a) (P-i), (Q-ii), (R-iii), (S-iv) (b) (P-iii), (Q-ii), (R-i), (S-iv)
 (c) (P-iv), (Q-iii), (R-ii), (S-i) (d) (P-iii), (Q-ii), (R-iv), (S-i)

136. Match the list :

Column I

- (P) Lotus and sunflower
 (Q) Crocus and tulip
 (R) Due to turgidity of leauses
 (S) Mimosa

Column II

- (i) Hydronasty
 (ii) Thigmonasty
 (iii) Thermonasty
 (iv) Photonasty

- (a) (P-iv), (Q-iii), (R-i), (S-iii) (b) (P-i), (Q-ii), (R-iii), (S-iv)
 (c) (P-ii), (Q-iii), (R-iv), (S-i) (d) (P-i), (Q-iii), (R-ii), (S-iv)

137. Covering surrouding embryo contain growth inhibitor hormone for dormancy.

- (a) Physical dormancy (b) Mechanical dormancy
 (c) External dormancy (d) Chemical dormncy

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138. In which type of dormancy, due to hardness of seed coats or integuments, embryo could not expand during germination ?
(a) Physical dormancy (b) Mechanical dormancy
(c) External dormancy (d) Chemical dormancy
139. Which type of dormancy is found when seed is impermeable to water or gaseous exchange ?
(a) Physical dormancy (b) Mechanical dormancy
(c) External dormancy (d) Chemical dormancy
140. Which type of dormancy, inhibits embryo growth and germination in seed ?
(a) Endogenous dormancy (b) Physiological dormancy
(c) External dormancy (d) Mixed dormancy
141. Which type of dormancy is found in seed causes physiology and external dormancy ?
(a) Mixed dormancy (b) External dormancy
(c) Physiological dormancy (d) Endogenous dormancy
142. What is the type of dormancy in which embryo do not differentiate into various tissue at the time of fruit maturation ?
(a) Internal dormancy (b) Physiological dormancy
(c) External dormancy (d) Mixed dormancy
143. During physiological and physical condition some changes observed in seed, is knows as
(a) Exogenous dormancy (b) Endogenous dormancy
(c) Combinational dormancy (d) Secondary dormancy
144. Which type of dormancy is induced in seeds due to adverse condition and high temperature ?
(a) Exogenous dormancy (b) Endogenous dormancy
(c) Combinational dormancy (d) Secondary dormancy

Asseretion - Reasoning type of questions :

A : Assertion (Statement)

R : Reason

Following option are common for questions number 145 to 157.

- (a) A and R both correct, R is explanation of A.
(b) A and R both correct but R is not explanation A.
(c) A = correct, R = false
(d) A = false, R = correct
145. A : Ethylene inhibits logitudinal growth of root stem and leaves.
R : Ethylene is growth inhibitor, maturation hormone.
(a) (b) (c) (d)
146. A : Seed is active condensed plant.
R : It shows specific dormancy and get activated.
(a) (b) (c) (d)

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147. A : Adventitious roots develop by auxin in plants.
R : Auxin, removes the dominant effect of apical bud.
(a) (b) (c) (d)
148. A : Cytokinin is cytoplasmic hormone.
R : Cytokinin induced cell division.
(a) (b) (c) (d)
149. A : Nastism is unidirectional.
R : Induced factors are essential for nastism.
(a) (b) (c) (d)
150. A : Tropism is unidirectional.
R : Specific modifications observed in plant due to tropism.
(a) (b) (c) (d)
151. A : Flowering is natural phenomenon in plants.
R : If photoperiodism is fixed, increases flowering in plants.
(a) (b) (c) (d)



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Answer Key

1	c	39	b	77	a	115	c
2	a	40	c	78	c	116	c
3	c	41	b	79	a	117	a
4	a	42	a	80	a	118	b
5	b	43	a	81	a	119	c
6	a	44	a	82	a	120	c
7	a	45	c	83	a	121	d
8	c	46	a	84	c	122	a
9	b	47	a	85	a	123	d
10	a	48	d	86	d	124	d
11	a	49	b	87	b	125	b
12	b	50	b	88	b	126	d
13	c	51	b	89	c	127	d
14	d	52	a	90	a	128	d
15	b	53	a	91	c	129	d
16	b	54	d	92	a	130	c
17	d	55	b	93	a	131	c
18	a	56	b	94	d	132	c
19	d	57	b	95	d	133	c
20	a	58	b	96	b	134	c
21	b	59	c	97	a	135	b
22	c	60	c	98	c	136	a
23	c	61	c	99	a	137	d
24	a	62	c	100	b	138	b
25	c	63	b	101	d	139	b
26	c	64	d	102	c	140	b
27	b	65	a	103	c	141	a
28	c	66	a	104	d	142	c
29	a	67	a	105	c	143	c
30	d	68	a	106	b	144	d
31	d	69	c	107	b	145	a
32	d	70	d	108	a	146	a
33	d	71	d	109	a	147	b
34	a	72	b	110	b	148	d
35	a	73	c	111	d	149	a
36	d	74	a	112	c	150	c
37	b	75	b	113	d	151	b
38	a	76	b	114	d		